

Title Changes in colour during high pressure processing of fruits and vegetables
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Abstract

Purpose of review: High pressure processing (HPP) is one of the innovative processing technologies applied to food materials for inactivating microorganisms and retaining quality at the highest level. HPP has been commercially used for some premium foods and the process is gradually gaining momentum in the food industry. Food quality and consumer acceptance remain the key issues for the success of any process and it applies to HPP as well. Colour is the first quality attribute of processed food and, therefore, this paper critically reviews the information available on colour changes in high-pressure processed fruits and vegetables and their products.

Main findings: HPP has been established as a processing technology with better quality retention for fruit and vegetable products. Generally, pigments are not affected by HPP, while the visual colour is most predominantly affected for foods rich in proteins and carbohydrates. The colour pigments (especially chlorophyll) in some green vegetables are affected by HPP in a similar way as with thermal processing, although other products show good retention of colour. However, colour-degrading enzymes in fruits and vegetables can be activated or inactivated by HPP, which may affect product colour. Products at a high pH require elevated temperature (60–70°C) in addition to high pressure (400–800 MPa) for complete inactivation of enzymes and microbial spores, in order to achieve shelf-stability and retain good colour.

Directions for future research: Synergistic effects among pressure, temperature and other variables on fruit and vegetable products should be evaluated to ensure product safety and stabilise product quality. Future research should focus on inactivation of enzymes in fruits and vegetables, which is a challenge to fruit and vegetable industry. In addition, emphasis should be placed on product safety with minimum quality losses in order for HPP to be recognised as one of the best emerging technologies and substitutes to thermal processing. High pressure extraction could be another technique for separation of heat-sensitive pigments and flavonoids from plants and herbs.